

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS**

SINGULAR COMPUTING LLC,

Plaintiff,

v.

C.A. No. 1:19-cv-12551-FDS

GOOGLE LLC,

Hon. F. Dennis Saylor IV

Defendant.

**STATEMENT OF MATERIAL FACTS IN SUPPORT OF
DEFENDANT GOOGLE LLC'S MOTION FOR SUMMARY JUDGMENT THAT THE
ASSERTED PATENT CLAIMS ARE PATENT INELIGIBLE**

1. Singular asserts claim 53 of U.S. Patent No. 8,407,273 and claim 7 of U.S. Patent No. 9,218,156. Declaration of Michael S. Kwun ¶ 3.
2. Each claims a “device” that comprises at least one LPHDR execution unit. *Id.*, Ex. 1 ('273 patent) at 31:62-64¹; *id.*, Ex. 2 ('156 patent), at 29:54-56.²
3. The LPHDR execution units of a device of the asserted claims must accept a dynamic range of the possible valid inputs that is “at least” as wide as from 1/1,000,000 through 1,000,000. '273 patent at 32:60-62; '156 patent at 30:21-23.
4. The asserted claims also require that for “at least” 5% of the valid inputs, the LPHDR execution unit outputs a signal that represents a numerical value that differs from the result of an exact mathematical calculation by “at least” 0.05%. '273 patent at 33:3-12; '156 patent at 29:62-30:4. Nothing in the asserted claims limits *how* this result should be achieved.

¹ Claim 53 of the '273 patent depends from claim 43, which itself depends from independent claim 36.

² Claim 7 of the '156 patent depends from claim 3, which itself depends from independent claim 1.

5. The asserted claims also recite an “exceeds” limitation that requires that the number of LPHDR execution units in the device exceeds by at least 100 the number of execution units adapted to perform mathematical operations on floating point numbers that are at least 32-bits wide (“32-bit precision execution units”). ’273 patent at 32:13-17; ’156 patent at 30:12-16.

6. Claim 7 of the ’156 patent also requires a computing device adapted to control the LPHDR execution units. ’156 patent at 30:5-6.

7. The common specification for these patents states that embodiments of “the present invention” are “directed to computer processors or other devices which use low precision high dynamic range (LPHDR) processing elements to perform computations (such as arithmetic operations).” ’273 patent at 5:65-6:2; *see also id.* at 2:11-18.

8. The specification does not set forth any particular structural approach for implementing the allegedly novel LPHDR processing elements. Rather it broadly asserts that “technologies whether based on transistors or not that are capable of implementing LPHDR architectures of the kinds disclosed herein” can be used—including hypothetical approaches such as “chemistry based technologies such as for DNA computing” *Id.* at 26:17-31.

9. It further states that the word “device” should be understood to mean anything that “performs the functions disclosed” in the patent. *Id.* at 29:5-15. This could include “hardware, software tangibly stored on a computer-readable medium, firmware, or any combination thereof.” *Id.* at 29:16-19.

10. Whatever technology is used, the claims do not disclose any limitation concerning how the numerical values are represented, and the specification emphasizes the absence of any such limitation, noting, for example, that one mechanism could be to use “a logarithmic

representation of the values,” while another would be to use “analog representations and processing mechanisms.” *Id.* at 6:10-12, 6:23-28.

11. The specification goes out of its way to assert that “analog and mixed signal embodiments” are “merely examples,” and not limitations. *Id.* at 16:14-16.

12. Google’s technical expert on invalidity issues, Dr. John L. Gustafson, opines that the limitations of the asserted claims do not embody any technological innovations. Kwun Decl., Ex. 3 (Gustafson Rpt.) ¶ 703. In so doing, he addresses the limitations individually, *id.* ¶¶ 704-19, and also in combination, *id.* ¶ 720.

13. Singular served only one expert report that addresses patent eligibility—Dr. Sunil P. Khatri’s rebuttal report. Kwun Decl. ¶ 7.

14. In the section of his rebuttal report that addresses patentability, Dr. Khatri begins with a summary opinion that the asserted patents “use a precise low-precision circuit to solve a technological problem that was not otherwise resolved by the art.” *Id.*, Ex. 4 (Khatri Reb. Rpt.) ¶ 255.

15. Dr. Khatri then repeats various assertions from the patent specification. *Id.* ¶¶ 256-59; *see also id.*, Ex. 5 (Khatri Opening Rpt.) ¶¶ 62-68 (cited in Khatri Reb. Rpt. ¶ 256).

16. Other than reciting the limitations of the asserted claims, Dr. Khatri cites nothing from the specification that discusses the specific limitations of the asserted claims. *See* Khatri Reb. Rpt. ¶¶ 256 & 259 (citing specification’s discussion of the state of the art), 257 (simply reciting claim limitations³), 258 (citing specification’s assertion that those of ordinary skill believed that the invention—without limitation to specific claims—was of little use).

³ Paragraph 257 illustrates the lack of elaboration or support that is typical of Dr. Khatri’s patentability opinions: “The Asserted Claims define LPHDR with very precise limitations. Claim 53 of the ’273 Patent sets forth particular minimum levels of precision

17. Dr. Khatri asserts that the use of LPHDR execution units is purportedly novel over the prior art, that they offer improved performance, and that reduction to practice required different hardware. *Id.* ¶¶ 257, 260-67. He does not further elaborate on or provide support for these assertions.

18. Dr. Khatri does not offer any opinions about facts that could underpin a legal conclusion that the claims as a whole are inventive. *See id.* ¶¶ 255-72.

Respectfully submitted,

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and specifies a dynamic range ‘at least as wide as from 1/1,000,000 through 1,000,000.’ ’273 Patent at col. 32 ll. 1-12, 60-62 [footnote 18: Claim 7 of the ’156 Patent sets forth identical parameters for precision and dynamic range]. Prior computing architectures did not include any such processing elements.”

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